HAKE INVESTIGATIONS

The hakes represent one of the three major species groups of the New England and Middle Atlantic area. The hake group includes the red hake (<u>Urophycis chuss</u>), the white hake (<u>U. tenuis</u>), the silver hake (<u>Merluccius bilinearis</u>), the American Hake (<u>M. albidus</u>), and several others of no immediate importance.

These fishes support food fisheries to a moderate extent and the industrial fisheries to a great extent. They are sufficiently similar from a morphological and ecological viewpoint that they are best studied as a group. At this time, it is particularly vital that this investigation concern itself with an intensive life history program designed to establish those population parameters required to make judgments on proper management procedures.

- 21. The distribution and abundance of the American hake
- 22. The definition of stocks of the American hake
- 23. Vertical distribution of the American hake
- 24. Seasonal distribution of the American hake
- 25. A study of the eggs and larva of the American hake

SUMMARY CONTROL SCHEDULE

Investigation: Hake Biological Laboratory: Woods Hole, Mass.

Dariort Aitio	Est.*				E	Fiscal	Years	S			
ALUJECU ILUZE	Cost	57	58	59	09	19	62	63	70	65	99
Silver Hake											
1. The definition of silver hake stocks	8. 0	8.0	1		1	1	-	1	1	-	
2. Tagging methods for the silver hake	18.0	8.0±0	0.01	-	!	1		1	1		
3. Age and growth of the silver hake	29.0	8.0	8,010,08	8.0 3	3.0		1	1	1	- 1	1
4. Length and weight relationship of the silver hake	21.0	1	10.0	8.0 3	3,0	-:	A T	1	1	1 1	-
5. Seasonal movements of the silver hake	23, 5	1	-	8,03	3,0	3, 5	4.0	5.0	1	-;	
6. An evaluation of the fishing effort data	32. 5	8.01	0.010	8.0 3	3.0	3.5	1	1	1	ľ	
7. Vertical distribution of the silver hake	20.5				3,0 3	3, 5	4, 0	5.0	5. d	1	
8. The study of possible management techniques	26.2				1	, 	4.0	5.0	5.0	6.0	6.2
9. The application of serological techniques	26.2	1	1	1	!	,	4.0	5.0	5.0	8	6.2
White hake											
10. Age and growth of white hake	17.2	1	-	1		ì	1	!	5.06.0	0.9	.6.2
11. The length and weight relationship of the white hake	17.2	-		!	-			1	5.0	6.0	6.2
12. Seasonal distribution of the white hake	12.2	I	!	1	1	1	1	! !	1	6.0	6.2
			-	-	-	-	-		-	-	-

SUMMARY C ROL SCHEDULE

Investigation: Hake Biological Laboratory:

cological Laboratory: Woods Hole, Mass.

3												1
•	1	<u>디</u>	ist.		-	-	1.1Sca	rears				-
	Project Title	O	Cost	22	28 - 29	09	19	62	63	79	9 3	99
Red hake										COMM		<u> </u>
13. The developm	The development of aging techniques		33, 5	8.010	0.08.0	4.0	3, 5	1	-	1	1	
14. Age and growt	Age and growth of the red hake		24.5		8,0	4.0	ಬ	4.0	5.0	1	!	1
	Distribution and abundance of the red hake		30.7	1	1	1	22	0	0	5.0	6. 07	8
	Seasonal movements of the red hake		23.5	1	1	7.	3.5		5.0	0	6.0	1
17. A review of re	A review of red hake biology		33, 5	7.910.	8	5 3.0	3.5	,	,	1	-	<u> </u>
American bake					_				-		-	-
18. The developm	The development of aging techniques	,	1.1	!		3,6	3, 5	4.0	-	1	-	!
•	Age and growth of the American hake		17.5	1		-	3.5	4.0	5.0	5.0	1	i l
	The length and weight relationship	, 			1				2	5.0	ı. I	1
	The distribution and abundance of the Amer.	hake	24, 4		1	1	0	8	2	5.05	0	1
	The definition of stocks of the American hake	9.	28.6	1	-	1 1	1	5.2	~	5 0 5	9	2
	Vertical distribution of the American hake		22.4		1	1	1		6.2 4	4.0 5	5.07	2
24. Seasonal distr	24. Seasonal distribution of the American hake	T	16.2	-	1	1	1	1	1	4.0 b.	0 7	7
25. A study of the	1 1	hake 1		1	-	1		1	3	3,85		က
			_	-	-					- -	_ -	
											_	
	Investigation	Total.	551,0	47.960	.026	5 29.6	6 40. 2	51.463.	13.866	6.867.1	167	一一
	Annual Review					ı				Ã	Date	
Laboratory	Regional or Area Office	Washington Office	e.	Prepa	Prepared by: Raymond L.	: Rayn	l puou	. Fritz	tz	9/8	16/59	7
				Recom	Recommended by	by:				A	Date	-
				Lab	Lab. Director Herbert W	tor He	rbert	Ŋ	Graham	, 8/	8/6/29	_
				Res	or Area	on Dir.	90	7	hye	Thursday Ellol	3/64/3	H
				Bran	u u		U	140	Ú	12-2	24. 19.	
				Approved	ved by:	••	•	Juc	j	1.7.1	.2.3	
						Div	Division	Chief	for D	Director	O.	
												-1
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												7
X		المعن المراب عمر الم										•

Objectives and prendences nearedly *Total needed by Laboratory for Project in theusands of dollars.

Sheet No. 1

Location: Woods Hole, Mass. Date: August 6 1959
File No.

Research Project Outline

Title of Project:	Age and growth of	the Silver Hake		
Investigation Tit	le: Hake Investiga	ation		
Investigation Chi	ef: Raymond L.	Fritz, acting		
Project Leader:	Raymond L. Fritz	F.R.B.	GS-7	
	Name	\mathtt{Title}	Grad∈	-
Assistants: (Tit	le and Grade)			
Cellaborators:				

Need for Information: Age and growth of a particular species is a basic research project and the results are required for other projects. This information is used to determine the age composition of the commercial catch or population, age at maturity and mortality rates.

Objective: To determine the growth rate of the silver hake in the Gulf of Mexico.

Method of Procedure: To collect and analyze otoliths from samples of all sizes of fish at several times a year.

Phase 1:

Shoet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total	Needed by Laborato	ry for Complete Project	29•0
	FY <u>1959</u>	FY <u>196</u> 0	FY <u>196</u> 1
Personal Services	2•0	1.8	por dels <u>mai</u>
Other Expenses: Within Project	0•6	0.1	Despendants
Lab. Adm. & Ser.	5.4		600 min too
Lab. Total	8.0	3.0	(Digitary top)
Regional Office Washington Office	,08	03	
Total			
Recommended Source of Function Estimated Date of Complete	(S-)	d Regular K, Regular, Contributed,	
Recommended by: Originator R.	L. Fritz		8/6/59 Date
Investigation Ch ief	R. L. Fritz	·	8/6/59
Laboratory Director	Herbert W. Graham		8/6/59
Regional Director	Joseph 4. Very	iochar	8/19/59
Branch ChiefApproved by:	1 1 MAS		12-24-17
approved by: Division Chief for Dire	ector Lich		1-2-62

Remarks

Sheet No. 1

Location: Woods Hole, Wass. Date: August 6, 1959 File No.

	Research Proje	ct Outline	
11010 OI 1101000.		hi of the Silver B	lake
Investigation Title:	Habe Investigati	oa	
Investigation Title: Investigation Chief:	ymond L. Prite,	កល ិត្ស	
Project Leader: aymon:	13. Fritz		GS-9
Assistants: (Title and G		TITLE	Grade
Villiam H. Callaha	n Stat. Clerk	G 3-4	
Collaborators:			
Need for Information: "Sweight of each fish in the commutations for	the catch. This	information is also	no namber and o usudin
Objective: To determin and the changes that r		oods weight by me one year to anothe	

Sameles will be collected, the length and weight

recorded. The basic analysis of the data

will be accome lished by using U.B.M. machines.

Phase 2:

Phase 1:

Method of Procedure:

Η	ake	L

Shcet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Tota	l Needed by Laborate	ory for Complete Project	21.0
	FY <u>1959</u>	FY <u>1960</u>	FY 1961
Personal Services	2.0	1.0	90 to 144
Other Expenses: Within Project	0•6	0.1	and the line
Lab. Adm. & Ser.	5.11	1.9	
Lab. Total	<u>8•C</u>	3.0	digens ins
Regional Office Washington Office	8	03	
Total			
Recommended Source of F . Estimated Date of Compl	(≲-	S-K and Regular -K, Regular, Contributed -; Phase 2 FY _; Phase 3_	•
Recommended by: Originator	R. L. Fritz		8/6/59 <u>Date</u>
Investigation Ch ief	R. L. Fritz		8/6/59
Laboratory Director	Herbert W. Graham		8/6/59
Regional Director	Joeph & Vine	inter	8/19/59
Branch Chief	U 1 2/HE.		12-24-59
Approved by: Division Chief for Di	rector Alien		1-2.60

Remarks

Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Seasonal movements of the Silver Hake
Investigation Title: Hake Investigation
Investigation Chief: R. L. Fritz
Project Leader: R. L. Fritz, Fishery Research Biologist, GS-9 Name Title Grade
Assistants: (Title and Grade)
Collaborators:
Necd for Information: The seasonal movements of this species remain unknown at this time. In order to delineate the population stocks, the seasonal movements or migratory patterns must be determined.
Objective: The seasonal distribution should be studied in order to determine the extent and the reasons for the migrations.
Method of Procedure: Tagging and surveys are necessary to complete this project.
Phase 1:
Phase 2:

Hake 5 Shoet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Tota	al Needed by Laborat	ory for Complete Project	23•5
	FY <u>1959</u>	FY <u>1960</u>	FY 1961
Personal Services	1.0	1.0	1.1
Other Expenses: Within Project	0•5	0.1	0•4
Lab. Adm. & Ser.	6.5	1.9	2.0
Lab. Total	8.0	3•0	3.5
Regional Office Washington Office	.08	.03	.035
Total			
	****	attender of the second	
Recommended Source of F	(S	nd Regular -K, Regular, Contributed	
Estimated Date of Compl	(S		
Estimated Date of Compl	(S Letion: Phase 1 FY 5	-K, Reguler, Contributed	FY Project FY 6
Estimated Date of Compl Recommended by: Originator R.	(S Letion: Phase 1 FY 5	-K, Reguler, Contributed	FY ; Project FY 6 Date 8/6/59
Estimated Date of Compl Recommended by: Originator R. 1 Investigation Chief	(S Letion: Phase 1 FY 5 L. Fritz R. L. Fritz Herbert W. Greham	-K, Reguler, Contributed	FY ; Project FY 6 8/6/59 8/6/59
Estimated Date of Compl Recommended by: Originator R. Investigation Chief Laboratory Director	(S Letion: Phase 1 FY 5 L. Fritz R. L. Fritz Herbert W. Greham	-K, Reguler, Contributed	FY ; Project FY 6 8/6/59 8/6/59 8/6/59

Remarks

Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959 File No.

Research Project Outline

Title of Project: An evaluation of the fishing effort on the Silver Hake
Investigation Title: Hake Investigation
Investigation Chief: R. L. Fritz, acting
Project Leader: R. L. Fritz, Fishery Research Biologist, GS-9 Name Title Grade
Assistants: (Title and Grade)
Collaborators:
Need for Information: A study of the fishing effort will aid the biologist in determining the relative abundance from year to year. A study of this type is necessary to define the variations that occur and to relate these variations to the biological and physical changes.
Objective: To determine the fishing effort in catch per hour or day of the whiting fleet of Gloucester, Mass.
Method of Procedure: An analysis of the number of pounds caught and the time involved by vessel category, by vessels catching 50 percent or more silver hake. Phase 1:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: To	tal Needed by Labora	tory for Complete Pro	oject 32•5
	FY 1959	FY 1960	FY1961
Personal Services	1.0	1.0	2.0
Other Expenses: Within Project	0.4	0.1	0•4
Lab. Adm. & Ser.	6.6	1.9	1.1
Lab. Total	8 <u>.</u> C	3•0	3•5
Regional Office Washington Office		•03	.035
Total			
Recommended Source of . Estimated Date of Comp	(S-K, Regular, Contrib	outed, etc.) Se 3 FY ;Project FY 6
Recommended by: Originator	R. L. Fritz		8/6/59 Date
Investigation Ch ief	R. L. Fritz		8/6/59
Laboratory Director	Herbert W. Gya		8/6/59
Regional Director	Joseph 4. V	uventur	8/19/59
Branch Chief	1 3448		12-24-59
Approved by: Division Chief for D	irector line		1-2-lee
	./		

Remarks

Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959
File No.

Research Project Outline

Title of Project	Vertical distribution	n of the Silver Hak	e
Investigation Ti	tle: Hake Investigat	ion	
Investigation Ch	nief: R. L. Fritz.	acting	TOI - Torroll thin to all accomplished relative to the properties despressed to the second section as a second
Project Leader:	to be assigned	$\mathtt{Titl}_{\mathbb{C}}$	Gr ade
Assistants: (Ti	tle and Grade)		
Collaborators:			
			·
Need for Information one area to	tion: To fully unders another, but vertical	tand the movement Uy from the bottom	s of this species not only to the surface.
	,		
Objective:To def	fine the nature and sc	one of the diurnal	migrations of the silver hake.
		opo or allo didirital	inglations of the street have,
		ng operations at se	veral offshore stations
for a 24-hour per Phase 1:	riod.		

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Tota	al Needed by Laborato	ry for Complete Proje	ct 20•5
	FY <u>1959</u>	fy <u>196</u> 0	FY 1961
Personal Services		1.0	2.0
Other Expenses: Within Project		0.1	0.4
Lab. Adm. & Ser.		1.9	1.1.
Lab. Total		3.0	3.5
Regional Office Washington Office		03	035
Total			
Recommended Source of F . Estimated Date of Compl	(S-	d Regular K, Regular, Contribute Phase 2 FY ; Phase	•
Recommended by:	R. L. Fritz		8/6/59 Date
Investigation Chief	R. L. Fritz		8/6/59
Laboratory Director	Herbert W. Greham		8/6/59
Regional Director	Joseph 4. Chim	ercher	8/19/59
Branch Chief Approved by:	1 2118		12-24-59
Division Chief for Di	rector List	(1-2.60
	Remark	cs	

Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959
File No.

Research Project Outline

Title of Project:	The Developmen	t of ageing techniques for t	he Red Hake
Investigation Tit	le: Hake Investig	ation	
Investigation Chi	ef: R. L. Fritz,	acting	
Project Leader:	R. L. Edwards, F	'ishery Research Biologist	, GS-12 Grade
Assistants: (Tit: L. M. Lawd	le and Grade) ay, Fishery Aide,		

Collaborators:

Need for Information: The red hake is the principal species caught by the industrial fishery. In order to determine the age composition of the red hake a method for ageing this species must be developed.

Objective: To examine the scales, otoliths and possibly other hard parts to determine the best indicator of age.

Mothed of Procedure: Collections of scales, otoliths and other parts to be made monthly throughout the year. An examination of these parts and Phase 1: an analysis of the data will be published.

Hake 13	Shcet	No.	2
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File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Tota	l Needed by Laborat	ory for Complete Projec	t <u>33•</u> 5
	FY 1959	FY <u>196</u> 0	FY 1961
Personal Services	1.0	1.0	1.0
Other Expenses: Within Project	0.3	0.1	0.1
Lab. Adm. & Ser.	6.7	2.9	2.4
Lab. Total	8.0	4.0	3.5
Regional Office Washington Office	080	•04	.035
Total			The same of the sa
Recommended Source of F Estimated Date of Compl	(S-	and Regular -K, Regular, Contributed ; Phase 2 FY ; Phase 3	•
Recommended by:	. Fritz		Date 8/6/59
Investigation Ch ief	R. L. Fritz		8/6/59
Laboratory Director	Herbert W. Graham		8/6/59
Regional Director	Joseph F. Vis.	rection	8/19/59
Branch Chief	1 314E.		12-24-59
Approved by: Division Chief for Di	rector MAH		1. 2 1.2

Remarks

Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959
File No.

Research Project Outline

Title of Projec	t: Age and growth	of the red hake		
Investigation T	itle: <u>Hake Investi</u> s	gation		
Investigation C	hief: R. L. Fritz	a acting		
Project Leader:	R. L. Edwards.	Fishery Research Biolog	ist, GS-12 Grade	
•	itle and Grade) wday, Fishery Aide	e, GS-5		
Collaborators:				

Need for Information: The age and growth of the red hake is of particular interest to the industrial fishery. The results from this study will determine the rate of growth of this species. These results can be used in other fishery problems such as population studies, age at maturity and others.

Objective: The objective of this study is to determine the rate of growth of the red hake in New England waters.

Method of Procedure: Collections made at several times a year of all available sizes of fish.

Phase 1:

Hake 14 Sheet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Tota	l Needed by Labor	ctory for Complete Projec	t 24.5
	FY <u>1959</u>	FY <u>19</u> 60	FY 1961
Personal Services	0.6	1.0	1.0
Other Expenses: Within Project	0.1	0.1	0.4
Lab. Adm. & Ser.	7.3	2.9	2.1
Lab. Total	8.0	4.0	3•5
Regional Office Washington Office	08	.04	.035
Total			
Recommended Source of Fr	unds	S-K and Regular	d, (tc.)
Estimated Date of Comple	etion: Phase 1 FY	59; Phase 2 FY ; Phase 3	FY Project FY 63
Recommended by: Originator R	.L.Fritz		8/6/59 Date
Investigation Chief	R. L. Fritz	·	8/6/59
Laboratory Director	^H erbert W. Grah	am	8/6/59
Regional Director	Joseph G. V	imedher	8/19/59
Branch Chief	1 Mg		12-24-59
Approved by: Division Chief for Dir	ector #1	· H	1.7.6.

Remarks

Sheet No. 1

Date: August 6, 1959

File No.

Research Project Outline

Title of Project:_D	istribution and abund	iance of red hake		
Investigation Title: Hake (presently part of Whiting sub-investigation)				
Investigation Chief:	R. L. Frite			
Project Leader:	R. L. Edwards	F.R.B. Title	08-12 Grade	
Assistants: (Title	and Grade) R. L. Frits L. Lewday W. Callahan	F.R.B. F.A. Stat. Clerk	GS-9 GS-5 GS-5	

Collaborators:

Need for Information: This species is the backbone of the industrial fishery. It is apparently fished heavily only in limited areas within its total range which is unknown. The present level of exploitation can only be crudely estimated pending more extensive information about the distribution and abundance of the entire population.

Objective: To define the distribution and relative abundance of the red hake, by season, in the Gulf of Maine and in the Middle Atlantic region.

Method of Procedure:

Phase 1: Analysis of previous census cruise data and further research vessel trips, particularly trips that promise to locate the winter-time centers of abundance.

Hake 15 Sheet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laborator	y for Complete Projec	t <u>30•7</u>
FY <u>1959</u>	FY <u>1960</u>	FY <u>196</u> 1
Personal Services Other Expenses: Within Project		1.0 0.2
Lab. Adm. & Ser.		2.3
Lab. Total		3•5
Regional Office Vashington Office		.035
Total		
	Regular, Contributed	
Recommended by: OriginatorR. L. Fritz	TRASE Z_TTRASE	8/6/59 Date
Investigation Chief R. L. Fritz		8/6/59
Laboratory Director Herbert W. Graham		8/6/59
Regional Director Louble & Pur	irlia	8/19/59
Branch Chief		12-24-59
Approved by: Division Chief for Director Division Chief for Director		102.60

Remarks

Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959 File No.

Research Project Outline

Title of Project:_S	easonal movements of	red hake.	
Investigation Title	: Hake (presently in	cluded in whiting)(ir	dustrial sub-investigation
Investigation Chief	R. L. Fritz, Actir	ıg	
Project Leader:	R. L. Edwards Name	F. R. B.	GS-12 Grade
Assistants: (Title		F•A•	GS-5

Collaborators:

Need for Information: The red hake so far has been difficult to tag. There seems to be at least two fairly distinct groups of red hake in the New England area. Somehow, perhaps by defining the seasonal movements, using commercial and research vessel catch data, it will prove possible to demonstrate that stocks do or do not exist in the area.

Objective: To define seasonal movements and to provide data that may be used to help define the presence or absence of stocks based on evidence of differential movements of groups of red hake.

Method of Procedure:

Phase 1: Analysis of commercial and research vessel catch data. Further cruises planned to check hypothises and to do experimental tagging.

Sheet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laborator	ry for Complete Projec	t 23•5
FY 1959	FY 1960	FY 1961
Personal Services	***	1.0
Other Expenses: Within Project		0•2
Lab. Adm. & Ser.		2.3
Lab. Total		3.5
Regional Office Vashington Office		.035
Total		American Commission of the Com
Recommended Source of Funds S-K and Reg (S-K Estimated Date of Completion: Phase 1 FY61;	K, Regular, Contribute	•
Recommended by: Originator R. L. Fritz	,	8/6/59 Date
Investigation Chief R. L. Fritz		8/6/59
Laboratory Director Herbert W. Graham	1	8/6/59
Regional Director Joseph & Page	nevelar	8/19/59
Branch Chief 3148		12-24-59
Approved by: Division Chief for Director		1.260

Remarks

Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959

File No.

Research Project Outline

Title of Project: A	review of the red l	nake biology	
Investigation Title:	Hake Investigation	1	
Investigation Chief:	R. L. Fritz, Actin	ng	
Project Leader:	R. L. Edwards	FRB	GS-12
: Assistants: (Title	Name and Grade) R. L. Fritz	Title FRB	Grade GS-9
Collaborators:			

Need for Information: A compilation of the present knowledge of the red hake is needed in order to intelligently plan future research.

Objective: To review all information on the red hake.

Method of Procedure: To write a review of the biology of the red hake, incorporating all aspects of fishery biology.

Phase 1:

No! The method is to search the fiterature and abstract it he piper use fitte

Method of Procedure: (Conttd)

Phase 3:

Estimated Costs: Tota	l Needed by Labora	tory for Complete Project	33•5
	FY 1959	FY <u>1960</u>	FY <u>196</u> 1
Personal Services Other Expenses:	1.0	1.0	2•0
Within Project	0.2	0.1	0.5
Lab. Adm. & Ser.	7.3	1.9	1.0
Lab. Total	8.5	3•0	3•5
Regional Office Washington Office	085		.035
Total			
Recommended Source of F Estimated Date of Compl	(S-K and Regular S-K, Regular, Contributed ; Phase 2 FY ; Phase 3	•
Recommended by: Originator R.L.	Fritz		8/6/59 Date
Investigation Chief	R. L. Fritz		8/6/59
Laboratory Director	Herbert W. Graham		8/6/59
Regional Director <u>s</u>	Joyle & Ve	and har	8/19/59
Branch Chief	U 1 2/W	£	12-24-59
Approved by: Division Chief for Dir	rector /	17	1-2-Ce

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Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959

evelopment of Ag ake Investigatio L. Fritz, Acti	n.	GS-9 Grade
L. Fritz, Acti	ng FRB	
L. Fritz	FRB	
ne	\mathtt{Title}	Gnodo
		Grade
Grade)		
. L. Edwards	FRB	GS-12
	L. Edwards	•

order to determine the growth rate and age composition of the American hake.

Objective: To determine the best possible method for aging the American hake.

Method of Procedure: To collect scales, otoliths and other parts and examine each of these for the best method. Phase 1:

Method of Procedure: (Conttd)

Phase 3:

Estimated Costs: Total Needed by La	aboratory for Complete Project	יניני
FY <u>1959</u>	FY <u>1960</u>	FY 1961
Personal Services Other Expenses:	2.0	2•0
Within Project	0•2	0.5
Lab. Adm. & Ser.	1.04	1.0
Lab. Total	3.6	3•5
Regional Office Washington Office	.036	•035
Total		
Recommended Source of Funds Estimated Date of Completion: Phase 1	S-K and Regular (S-K, Regular, Contributed	
Recommended by: Originator R. L. Fritz	rnase 2 F1 ; rnase 3	8/6/59 Date
Investigation Chief R. L. Fritz		8/6/59
Laboratory Director Herbert W. Gr	a ham	8/6/59
Regional Director	Perrection	8/19/59
Branch Chief	tz.	12-24-59
Division Chief for Director	4	1-26

Remarks

Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959

Research Project Outline

Title of Pro	ject: Age a	nd Growth of th	e American Hake (Me	erluccius olbidus)
Investigation	n Title: <u>Ka</u>	ce (project pr	esently in industr	rial)
Investigation	n Chief: <u>R</u>	L. Fritz. Acti	ng	
Project Lead	er: R. Nar	Le Fritz ne	FRB Title	GS-9 Grade
Assistants:	•	Grade) L. Edwards	FRB	GS-12

Collaborators:

Need for Information: The American hake is as yet unexploited and represents a potential fishery. A research effort directed toward it now will serve two purposes: (1) it will aid in the interpretation of population studies of exploited fishes, and (2) will do the ground work on the population that should be done on any species prior to exploitation.

Objective: To define the growth rate and its variations, geographically and as a result of environmental change.

Method of Procedure:

Phase 1: Analysis of the studies being conducted on the use of scales and cloliths as tools for aging this species.

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory f	or Complete Proje	ct 17.5
FY <u>1959</u>	FY 1960	FY_ 1961
Personal Services	time para pira	2•0
Other Expenses: Within Project		0.5
Lab. Adm. & Ser.	444 500 cm 454 404 7	1.0
Lab. Total	est 4m	3.5
Regional Office Washington Office		•035
Total		eteritire, discontinuos e mailine su minimizare e mailine de la companya e mailine de la companya de la company
Recommended Source of Funds (S-K, R Estimated Date of Completion: Phase 1 FY 61; Phase	egular, Contribut	·
Recommended by: Originator R. L. Fritz		Date 8/6/59
Investigation Chief R. L. Fritz	•	8/6/59
Laboratory Director Herbert W. Graham		8/6/59
Regional Director fresh & Vuner	than	8/19/59
Branch Chief 2 July 2.		12.24-59
Approved by: Division Chief for Director		1260

Remarks

Sheet No. 1

Location: Woods Nole, Mass. Date: August 6, 1959 File No.

Research Project Outline

Title of Project: L	ength and weight rel	ationship of the	American hake.	
Investigation Title:	Hake Investigation	•		
Investigation Chief:	R. L. Fritz, Actin	<u> </u>		
Project Leader:	R. L. Frits	FRB	08-9	
	Name	Title	Grade	
Assistants: (Title	and Grade) R. L. Edwards	Fib	G 8-12	

Collaborators:

Need for Information: Data needed in the analysis of the species as a resulting potential fishery resource.

Objective: To determine the seasonal variations in length-weight relationship of the Americ n hakes

Method of Procedure: Collect of length-weight data from material obtained on survey cruises.

Phase 1: Statistical analysis of data (IDP)

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by	Laboratory for Comple	te Project 17.4
FY <u>1959</u>	FY	1960 FY 1961
Personal ServicesOther Expenses:		1.0
Within Project	\$ ACC 147	0.2
Lab. Adm. & Ser.	<u> </u>	3.0
Lab. Total		2.2
Regional Office Washington Office		.022
Total		employee a glassified employee and a substitute a substitute and a substit
Recommended Source of Funds Estimated Date of Completion: Phase	, <u> </u>	ontributed, etc.) ;Phase 3 FY ;Project Ev ⁶
Recommended by: Originator R. L. Fritz		8/6/59 ^{Date}
Investigation Chief	. 5 2	8/6/59
Laboratory Director	maham	8/6/59
	SEPH F. PUNCOCHAR	8/19/59
Branch Chief HDWARD	i. ECKLES	12-24-39
Approved by: Division Chief for Director	liet	1-26

Remarks

Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959
File No.

Research Project Outline

	-			
Title of Project: Dist	ributi	on and abunda	nce of the Amer	doan hake.
Investigation Title:	Hake	Investigation	•	
Investigation Chief:	R. L.	Frits, Actin	g	
Project Leader:	R. L.	Frits	FRB Title	96-9 Grade
Assistants: (Title and) Ed wards	FRB	0 8-12
Collaborators:				
Need for Information: The distribution durator commercial explo	ring t	he year and th	ected in this p ne availability	roject will determine of this species
Objective: To determine	e the e	distribution :	and abundance o	f the American hake.
Method of Procedure: Col Phase 1:	Llect	and analyse de	ata from survey	cruises.

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory	for Complete Project	24
FY <u>1959</u>	FY <u>1960</u>	FY_1961
Personal Services Other Expenses:	Constitution	2.0
Within Project	The day has	1.0
Lab. Adm. & Ser.	4 0	****
Lab. Tetal	\$40 top 104	3.0
Regional Office Washington Office		•03
Total		
recommended source of runds	and Regular Regular, Contributed,	, (tc.)
Estimated Date of Completion: Phase 1 FY ; Ph	nase 2 <u>FY</u> ;Phase 3 F	Y Project IY
Recommended by: OriginatorR. L. Fritz		8/6/59 Date
Investigation Chief R. L. Fritz		8/6/59
Laboratory Director hornert was range		8/6/59
Regional Director SIGNED: JOSEPH F. PUNCO	CHAR	8/19/59
Branch Chief HOWARD H. ECKLES		12-24-57
Approved by: Division Chief for Director		1-2-6

Remarks